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ABSTRACT

Lev Vygotsky argues that natural properties as well as social relations, constrain--and therefore make possible--the social construction of a child's higher psychological processes. Most social constructivists in the cultural-historical tradition focus on three Vygotskian tenets: (1) the internalization of auxiliary cultural means or signs constitutes the development of higher psychological operations; (2) the interpersonal, or social, process of mediation is the fundamental motive force for higher cognitive growth; and (3) a child's knowledge is formed within the zone of proximal development, a cognitive space defined by social relational boundaries. Little account, however, has been taken of Vygotsky's contention that there is a fundamental functional relationship between culturally produced cognitive development and natural, or biological, growth. He clearly perceives two distinct sets of processes which explain development. The first is the natural line of development, encompassing the physical, biological, and neurological determinants, or the material determinants, of organismic growth. The second is the cultural line of development, encompassing those social processes which transform nature through the mastery and use of cultural signs. Nature, or the natural development of a child's behavior, forms the material conditions for a child's higher psychological growth; culture (and its historical development) produces the conditions within and the means through which this higher psychological growth can be manifested. The place of Vygotsky's theories in the contemporary dispute in Marxist theory about the relative meanings of "nature" and "society" is also discussed. (AC)

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THE MATERIAL AND THE SOCIAL IN VYGOTSKY'S THEORY OF COGNITIVE DEVELOPMENT

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...cultural development does not create anything
over and above that which potentially exists in the
natural development in the child's behavior.
Culture, generally speaking, does not produce
anything over and above that which is given by
nature. But it transforms nature to suit the ends of
man.

(Lev Vygotsky, 1928:418)

When I first read the article containing the above lines in
the early 1980s, their significance passed me by completely.
Vygotsky was, after all, the parent of cultural construction
in developmental psychology. Even though he recognised the
natural line of cognitive development, the real contribution
of his Cultural-Historical Psychology lay in the demonstration
that human cognitive development was only possible on the
basis of the mediation and internalization of cultural signs.

Recently, I read the article again: this time, my critical
insights having been sharpened by G A Cohen's (1978)
discussion of the categories of the material and the social,
the lines almost jumped out of the page at me. Here was a
claim which seemed to fit uneasily with the mainstream view of
Vygotsky as a cultural constructivist: how is it that culture

is fundamental to constructing higher forms of cognition, and at the same time, produces nothing "over and above that which is given by nature" ?

The aim of this paper is provide an account of this paradox in Vygotsky's writings, and to suggest that it is only an apparent contradiction in terms. The paper should be read as a contribution to debate on the significance of the natural line of development within Vygotskian theory.

Undoubtedly, Vygotsky's most important contribution was to theorise the necessary contribution of culture to the formation of the higher psychological processes of the child; nonetheless, it is clear that he understood that natural properties, and not only social relations, constrain, and therefore make possible, this social construction of higher psychological operations. My argument here is that we need to rescue and elaborate this notion of natural constraint, within the overall context of the theory, if we are to do full justice to Vygotsky's own conception of the Vygotskian research programme.

Caveat

This paper suggests that to read the Vygotskian notion of social construction correctly is to ground it in a fundamental recognition of natural and biological possibility. Certainly, there are grounds for this claim in Vygotsky's formulations. But in its present form the argument is tentative; a more

systematic exegesis of his writings is necessary to cement my claims. To paraphrase a concern of Vygotsky which I shall quote later, one cannot cull bits and pieces from a range of theoretical works and pretend that they constitute a systematic account of "the theory".

Nonetheless, the orientation that I propose and the resultant debate is worth placing on the theoretical agenda, not least because we developmental psychologists who are social constructivists need to reclaim the biological and the natural as our own.

Social Construction

As intimated earlier, I have no radical dispute with Vygotsky's contention that higher psychological processes are, in some fundamental way, culturally constructed. Indeed, it was the seminal distinction between the natural and cultural lines of development (or, equivalently, the lower and higher psychological processes) itself that placed the socio-historical construction of mind irrevocably on the theoretical and research agenda of developmental psychology. It distinguished Vygotsky from his most notable contemporary, Jean Piaget, whose central concern was the biological construction of mind. Vygotsky's theory focussed attention on mental growth which takes place as a consequence of social intervention, and without any corresponding physiological, neurological or biological changes.

Thus, there are a number of crucial, interlocking theoretical notions that have correctly come to constitute the central pillars of the Cultural-Historical tradition. The following are three of the most important (and are specifically mentioned here with my later arguments in mind):

- A. The internalisation of auxiliary cultural means, or signs, constitutes the development of higher psychological operations. For Vygotsky, all specifically human (as opposed to animal) cognitive operations constructed during the course of development are instances of the "internal reconstruction of an external [social] operation" (1978:56). They are initially concrete cultural relationships between people, inscribed in language (more technically, in the linguistic sign); children acquire these cultural relations, or sign systems, as their own practices in the course of social interactions, specifically through the mechanism of speech (being spoken to and speaking); finally they learn to apply these sign systems in the regulation and direction of their own thinking.
- B. The interpersonal (that is, irreducibly social) process of mediation is the fundamental motive force for higher cognitive growth. In general, the cognitive mastery of socially determined experience takes place in a similar way for all children. A significant adult, teacher or more capable peer separates out objects or events in a

child's environment using the historically laid-down language system, and in so doing changes the environment as perceived by the child. The communication thus established constructs a new form of organised cognitive activity in the child which is mediated in its structure.

- C. The zone of proximal development (ZPD) is probably the most widely known aspect of Vygotsky's theory; he describes it as "the distance between the actual level of development as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (1978:86). Notwithstanding the psychological imprecision of this formulation (see Wertsch, 1984), the primarily social constructive character of the ZPD is clear. Vygotsky is designating the cognitive space within which a child's knowledge is formed, but it is a space whose boundaries are social relational (interpsychological or intersubjective).

Taken together, notions of cultural construction such as these, and their ongoing theoretical development, form the core of a Vygotskian research programme.

The growing Soviet, post-Soviet and non-Soviet interest in Vygotsky which characterised the past decade has contributed greatly to this project. There is a significant body of

contemporary literature which elaborates and extends our understanding of the cultural construction of cognition, both theoretically and within important domains of practice (notably instruction).

The Natural Line

Very little account, however, seems to be taken of Vygotsky's contention that there is a fundamental functional relationship between culturally produced cognitive development and natural, or biological, growth. When one reviews the contemporary Anglophone literature on Vygotsky, it is as if the natural line of development has been silenced. Although it is recognised by some that this is a weakness (Wertsch, 1985) or a misinterpretation (Brushlinskii, 1979), there is a tiny proportion of the literature on Vygotsky that is centrally concerned with this notion.

Perhaps the most significant exception is the small but convincing body of recent literature (see van der Veer & van Ijzendoorn, 1985) which suggests that the development of the lower psychological processes is as much subject to cultural construction as the higher psychological processes, perhaps even contrary to Vygotsky's own formulations. There is an increasing recognition of the need for a much more rigorous understanding of the articulation in development of the natural with the cultural line in an adjusted Vygotskian research programme.

My concern here is similar, but it cuts in the opposite direction. I want to go on to argue that an adequate Vygotskian research programme must grasp and develop this crucial point: that the cultural formation of higher psychological processes does not transcend the supposedly static, "natural" realm of the lower psychological processes. Rather, it arises as much within the material possibilities and constraints of nature as it does within the social relations of culture.

There is clear evidence in Vygotsky's writings that this is what he believed, although he too did not develop such claims to any great degree. But before discussing the textual evidence, it is useful to say something about the broad theoretical context which underlies this reading of Vygotsky.

The Material and the Social

A crucial contemporary dispute in Marxist theory is to the point here: it is one which concerns the relative meanings of the terms "nature" and "society" (or, equivalently, the "material" and the "social"). To set up the dispute, let us recall this well-known quotation from Vygotsky:

... by changing Marx's well-known proposition, we might say that the development of a child's thought is the internalization of social relationships which become the forms and contents of its structure. (Translation by Sutton, 1980:28; for alternative translation, see Vygotsky, 1981:164; 1984:59).

The well-known proposition to which he is referring is, of course, the sixth thesis on Feuerbach:

The human essence is no abstraction inherent in any individual. In its reality it is the ensemble of the social relations. (Marx, 1978:VI)

This thesis has often been used, in my experience, to support an account of Vygotsky which claims that cognition is exclusively socially determined, and that therefore, any concept of human nature is incompatible with his (Marxist) theory. This interpretation (of both Marx and Vygotsky) is, I believe, incorrect.

Norman Geras (1986) demonstrates, in his important book (for psychologists), Marx and Human Nature, that the sixth thesis on Feuerbach has been interpreted in three different ways:

- (I) In its reality human nature is conditioned by the ensemble of social relations.
- (II) In its reality human nature is manifested in the ensemble of social relations.
- (III) In its reality human nature is determined by, or dissolved in, the ensemble of social relations.

Geras argues convincingly that, given the context of the rest of his work, Marx could not possibly have intended (III) when he jotted down the very brief Theses on Feuerbach. I am working here towards a similar claim concerning Vygotsky's notion of the higher psychological processes.

The important point for my argument is the opposition that Geras sets up concerning the origins of social relationships. If we accept interpretations (I) or (II), then we commit ourselves to the notion that some of the constraints and possibilities on the development of social relationships lie in human nature, and therefore that material, natural

properties of human beings pre-exist social processes. If, on the other hand, we accept interpretation (III), then the constraints and possibilities that operate on social relationships are themselves within the social.

The theoretical cleavage here runs deep. At stake is a wide-ranging debate concerning the relationship between the "material" and the "social" in contemporary Marxist theory.

On the one hand, a tradition associated with the French structuralist, Althusser (1971; 1977; Althusser & Balibar, 1970) argues that social relations are in themselves material. So, for example, an ideological relation such as racism is a real ensemble of lived social practices (in South Africa: getting onto segregated buses, employing a black migrant worker, etc.). It is not, for Althusser, a state of "false" or distorted consciousness on the part of a person who might be considered to pre-exist, or in some human sense to be outside of, that ideological relation (see Althusser, 1971:149-173). "Subjectivity" is thus conceived entirely as a social construction: the human being is interpellated (or "hailed") as a subject within prevailing social, political and ideological practices, and she has no identity outside of those prevailing relations. Social relations in themselves constitute an irreducible human subjectivity.

Consequently, Althusser is a firm opponent of the notion that there is some kind of human nature or human essence which in

any way constrains our interpellation as subjects within prevailing social relations. His "theoretical anti-humanism" (Althusser & Balibar, 1970:119) amounts to an affirmation that "the human essence" is entirely dissolved in social relations (Geras' interpretive possibility III). For Althusser, there is no sense in which a human "subject", or indeed a human organism, can be considered to construct, or even constrain, its conditions of existence in society.

To use Vygotskian terminology, we might say that on this account of the human subject, there is nothing prior to or beyond mediation.

Ranged against Althusser's doctrine in various ways is a strong defence of the notion of an essential human nature associated with the broad tradition we might term Marxist Analytic Philosophy. I have already mentioned Geras' important argument in this regard, but I wish to turn to Cohen's more fundamental philosophical account of Marxism in order to make my point about Vygotsky firmly.

Cohen (1978) insists that in a Marxist analysis a distinction has to be drawn between the material and social properties that accrue to objects and to persons. In a close analysis of the various theoretical contrasts Marx makes between nature and society, he comments thus:

Commentators have failed to remark how often he uses 'material' as the antonym of 'social' and of 'formal', how 'natural' belongs with 'material' against 'social', and how what is described as

material also counts as the 'content' of some form.... The upshot of these oppositions and identifications is that the matter or content of society is nature, whose form is the social form. (Cohen, 1978:98)

This opposition can be expressed in this way: according to Cohen, the Marxist argument is that certain properties accrue to society by virtue of its material character (the level of development of the productive forces), certain properties accrue to it by virtue of its social relational character (the level of development of the social relations of production), and that we must not confuse the two.

Likewise, it can be said that certain properties accrue to a person naturally and others socially:

A description of ... (sexual) intercourse in natural terms will feature only those properties which belong to (the persons involved) as natural organisms. Now this relationship occurs within the frame of a social relationship, of courtship, marriage, adultery, etc., but the physical properties do not reveal its social character. (Cohen, 1978:93)

So social properties should not be viewed as the same thing as natural or material properties; rather, social relations are the form within which the natural properties of persons or things are manifest (recall Geras' interpretive possibility II). Unlike Althusser, Cohen's account of Marxism holds that social relations are not to be viewed as in themselves material, but rather as acting on the material.

Bearing in mind Vygotsky's Marxist commitments -

I don't want to discover the nature of mind by patching together a lot of quotations. I want to

find out how science has to be built, to approach the study of mind having learned the whole of Marx's method." (Quoted by Zinchenko & Davydov, 1985:ix)¹

- this dispute between the accounts of Marxism offered by Althusser and by Cohen helps us a great deal in understanding Vygotsky's intentions when he drew a distinction between the natural and cultural lines of development in the child.

Nothing Over and Above the Natural

Vygotsky's account of cognitive growth in children is consistent with the account of Marxist theory and method offered by Cohen. He quite clearly perceives two distinct sets of processes which explain development: the first set encompasses the physical, biological and neurological (i.e. material) determinants of organismic growth, and is termed the natural line of development; the second encompasses those social processes which transform nature not through organic means but through the mastery and use of cultural signs. This second set of processes is termed by Vygotsky the cultural line of development.

Furthermore, his account of development tends to conceive of the cultural construction of cognition as formed within, and not as autonomous of, a natural and biological context. Witness this succinct comment: "the problem occurs in the

¹ Note that there is an important dispute about whether there is a distinct Marxist methodology of any sort (see Elster, 1985:3). Nonetheless, what this quotation establishes is that Vygotsky was self-consciously concerned with the broad Marxist theoretical project.

process of the natural activity of the child, but its solution requires some roundabout way or the application of some [cultural] means" (Vygotsky, 1929:419). Note that this is perfectly consistent with the Vygotskian claim that the cultural line of development is crucial to the construction of higher psychological processes.

The quotation at the outset which posed the central dilemma of this paper provides clear support for this reading of Vygotsky: nature, or the natural development of a child's behaviour, is understood to form the material conditions for a child's higher psychological growth; culture (and its historical development) is understood to produce the conditions within and the means through which this higher psychological growth can be manifested.

A further elaboration later on in the same text cements my claim here:

When we purposely interfere with the course of the processes of behavior, we can do so only in conformance with the same laws which govern these laws in their natural course, just as we can transform outward nature and make it serve our ends only in conformance with the laws of nature. (Vygotsky, 1929:418)

Again, natural conditions provide the developmental possibilities and constraints, and a distinct set of social mediational processes can provide for cognitive transformation.

It may be argued that this 1929 text is in some way atypical.

However, the Cohen-like distinction between the natural and the cultural is apparent in numerous equivalent distinctions which Vygotsky makes throughout his writings. I turn now to some instances of this.

Internalisation, Mediation and the ZPD

Earlier, three key Vygotskian notions of cultural construction were outlined in defence of the claim that the Cultural-Historical tradition gives primacy to the cultural line in accounting for cognitive growth. Further elaboration of these notions, however, also makes it clear that it was Vygotsky's inclination to view cognition as generated in relation to natural and material properties:

- A. When we internalise (auxiliary) cultural signs as the basis for sophisticated, human cognitive functions, we do so in terms of specific natural constraints and possibilities. For example, one aim that Vygotsky (1929:419; 1962:33-41; 1978:20-23; 1981:208-216) has in his frequent citation of Kohler's comparative experiments is to demonstrate that only human beings *qua* species have the capacity to operate with sophisticated linguistic signs (speech) in memory, voluntary attention, etc. Even the sophisticated chimpanzee is naturally (i.e. materially) distinct from humans in "the independence of [its]...actions from speech" (Vygotsky, 1962:34). Yet, in the human child, developmentally speaking, speech is not independent of the origins of intelligence, and its

growth is naturally constrained:

the child's system of activity is determined at each specific stage both by the child's degree of organic development and by his or her degree of mastery in the use of tools. (Vygotsky, 1978:21, original emphasis)

It is clear that Vygotsky sees the formation of higher psychological functions, through speech, as the social re-organisation of natural psychological functions. This process is not independent of the functioning of human nature, in the way that Althusserians might wish.

- B. Mediation, for Vygotsky, also has (independent) material properties which give form to the social relationship between a child and a mediator. Mediated attention "falls completely under the general law of the cultural development and formation of the higher forms of behaviour" (Vygotsky, 1981b:207), but this entails that "it is possible only by applying natural laws to the operation that is the object of cultural development" (Ibid:207, my emphasis). What is Vygotsky getting at here? He is, I believe, putting forward a notion of social construction similar to Bhaskar's (1989:39-40) realist account of knowledge construction in science: mediation generates (as a result of certain social operations) a set of developmental processes in the child's mind, but it does not produce or contain the underlying psychological properties (laws) which make this possible. These are neurophysiological and biological constraints and mechanisms.

C. Vygotsky's description of the ZPD quoted above is phenotypic; it is far-and-away the most frequently quoted definition of the ZPD. However, in relation to the present argument about the category of the material in Vygotsky's theory, his genotypic description of the ZPD is much more interesting:

The zone of proximal development defines those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. These functions could be termed the "buds" or "flowers" of development rather than the "fruits" of development. The actual developmental level characterizes mental development retrospectively, while the zone of proximal development characterizes mental development prospectively. (1978:86-87)

As is well known, the ZPD denotes a space of possible development (in the sense that it specifies only so many possible courses for further elaboration), the "buds" of development. It arises out of those functions which are "completed developmental cycles" (Vygotsky, 1978:85, original emphasis) and have already matured (i.e. they exist as material properties of the organism at that point in time), but on the basis of new functions which arise from the mediation of appropriate social means (i.e. functions which are internalised by the organism as social properties at the same point in time). The former set of properties Vygotsky terms the actual level of development, and the latter set of properties he terms the potential level of development. The distinction between the two rests on the notion that, at the point of development, the first is a material condition and the second a social condition.

So it is clear that Vygotsky is using the distinction in much the same way as Cohen claims Marx intended it. In his view, the material properties of mind which provide constraints and possibilities for the social construction and development of cognition.

Conclusion

This article has argued that the material, or natural, component of cognitive development is crucial to Vygotsky's theory. When he states in his 1929 article that social mediation "does not produce anything over and above that which is given by nature", it not some bizarre theoretical slip which is fundamentally at odds with his overall account of the social construction of knowledge. Rather, it a statement of the fundamental relationship which he thinks exists between the natural and social determinants of mind.

Any legitimate reading of Vygotsky must recognise that higher psychological processes arise culturally, indeed that cultural mediation is the crucial factor in explaining how they arise. However, this does not deny the claim that the psychological constraints and possibilities that make possible the cultural development of thought are natural constraints and possibilities. Indeed, in the way Vygotsky formulates his distinction between "the natural and cultural lines of development", he seems to confirm the claim.

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